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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,424	08/28/2003	Megan A. Fannon	107044-0031	7242

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EXAMINER	
ECHELMEYER, ALIX ELIZABETH	
ART UNIT	**PAPER NUMBER**
1795	

MAIL DATE	DELIVERY MODE
12/16/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/650,424	FANNON ET AL.	
	Examiner	Art Unit	
	Alix Elizabeth Echelmeyer	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,6-8,10-14,22,24 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,6-8,10-14,22,24 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed September 12, 2008. Claims 1, 3, 6, 7, 11, 14, 22 and 24 have been amended. Claims 2, 5, 9, 15-21 and 23 are cancelled. Claims 1, 3, 4, 6-8, 10-14, 22, 24 and 25 are pending and are rejected finally for the reasons given below.

Claim Rejections - 35 USC § 112

2. The 112 rejections of June 12, 2008 are withdrawn in light of the amendments.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4, 7, 10-14, 22, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaesterer (US 2003/0235744) in view of Fuglevand et al. (US Patent 6,030,718) and Roche et al. (US 5,097,104).

Pflaesterer teaches a sealing arrangement for fuel cells that is created by injection molding a seal to hold the deformable membrane electrode assembly (MEA) between a pair of separator plates (abstract, [0014], [0028]).

Pflaesterer further teaches that the sealing band holds the MEA in compression (abstract), since contact pressure is applied to the assembly during the formation of the seal ([0029]). Since the seal holds the components in compression, additional mechanical clamps are omitted in this invention ([0044]). The compression of the mold inherently reduces the thickness of the components.

Concerning the holding together of the fuel cell without using screws and nuts, Pflaesterer teaches that the *cells* are held together by the seals while the *stack* my be held together with endplates and tie bolts. The cells of Pflaesterer are clamped by the seals ([0016]). The instantly claimed invention is drawn to fuel cells, not stacks with the exception of claim 6, which claims an array but the individual cells are held together by the seal. One having ordinary skill in the art at the time the invention was made could easily recognize that the *cells* of Pflaesterer are held together in compression by "clamping" seals while *stacks of the fuel cells* are held together by bolts. Also, the seal of Pflaesterer is a thermoplastic elastomer ([0018]).

Additionally, Pflaesterer teaches that the sealing function is approximately equal in the middle and end regions of the stack ([0013]). Thus, the compression is even across the entire area.

The separators also serve as current collectors and sandwich the MEA ([0006], Figure 1).

As can be seen in Figure 2 of Pflaesterer, a separator (**4**) contains a raised area (adjacent **34**). This raised surface limits the thickness of the gasket (**24**) since the gasket does not extend beyond the raised surface.

Further regarding claim 22, the cells of Pflaesterer contain anodes and cathodes ([0043]).

Regarding claim 4, Pflaesterer teaches injection molding the seal in the frame ([0014]).

With regard to the curing limitation (H) of claim 1, (I) of claim 6, (D) of claim 7, claim 10 and (I) of claim 11, it would be inherent to the invention of Pflaesterer to allow the seal to cure within the mold, since, if the seal was not cured before the mold was removed, it would not properly form.

As for the limitations to the membrane electrode assembly and catalysts, these are taught in Pflaesterer ([0046]), and should be known to one having ordinary skill in the art.

As for claim 24, gas diffusion layers are provided for the electrodes ([0019]). Since the instant specification also teaches gas diffusion layers, one of ordinary skill in the art would recognize that gas diffusion layers can allow supply and even distribution of reactants.

Pflaesterer fails to teach leads on the current collectors and the hot pressing step of claim 11.

Fuglevand et al. teach current collector plates having conductive members that extend beyond the outer frame of the plate. These conductive members are received in the outer wall of the fuel cell container for easier conduction of electrical energy generate by the fuel cell. Fuglevand et al. further teach the coating of a diffusion layer

on the current collector plate for maintaining electrical contact (Figure 18; column 20 lines 39-67; column 21 lines 1-41). Fuglevand et al. further teach a hot pressing step prior to sealing the components of the fuel cell (column 17 lines 65-67; column 18 lines 1-6).

It would be advantageous to use the current collectors having leads taught by Fuglevand et al. in the fuel cell of Pflaesterer, as well as the diffusion layer of Fuglevand et al., in order to facilitate the conduction of the electricity produced by the fuel cell.

In this case, the current collector with leads is interpreted to be a lead frame with integrated current collector since the integrated part is a structure designed for giving support to the rest of the components of the fuel cell.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the current collector with leads as taught by Fuglevand et al. as well as the diffusion layer as the current collector of Pflaesterer in order to make the conduction of electricity produced by the stack more efficient.

The newly added limitations to the independent claims concerning integrating the current collector into the lead frame component onto which the membrane is placed are inherent in the combination of Pflaesterer in view of Fuglevand et al. As discussed above, Fuglevand et al. renders the current collector lead frame obvious. Thus, the lead frame is integral to the current collector.

As for the limitations concerning the use of the current collector to protect the protonically conductive membrane and active areas of the diffusion layers of the fuel cell

while the molding place, this limitation concerns the intended use of the current collector. According to the MPEP, the manner of operating a device does not differentiate apparatus claims from the prior art (MPEP 2113). While the claims are method and not apparatus claims, the limitations are to the intended use of the claimed apparatus, specifically the current collector. Further, the current collector would inherently protect the membrane and diffusion layers during the molding process because it provides a barrier between those components and the hot, dry conditions found during the molding process.

With regard to claim 25, Pflaesterer et al. fail to teach openings in the current collectors and membrane. The combination of the current collectors of Fuglevand et al. with the cell of Pflaesterer as discussed above teaches openings in the current collector to receive fasteners (Figure 10, column 8 lines 37-41). Since the fastener of Pflaesterer is a seal, and since the seal of Pflaesterer extends to the area where the openings of Fuglevand et al. are, the openings would allow the plastic of the seal of Pflaesterer to flow to form a plurality of internal fasteners.

The membrane of Fuglevand et al. is porous because it supports the electrolyte and provides mechanical strength (column 19 lines 1-5). Since it is porous, it inherently includes openings. Such openings would allow plastic to flow if the membrane was used in the cell of Pflaesterer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a porous membrane such as taught by Fuglevand et al. in

the cell of Pflaesterer because a porous membrane would support the electrolyte and provide mechanical strength.

With further regard to claims 1, 6, 7, 11, 14 and 22, Pflaesterer in view of Fuglevand et al. fails to teach trimming excess material from the lead frame after forming the membrane electrode assembly.

Roche et al. teach the trimming of excess material from the current collector after the pressing operation to seal the components of the fuel cell. Trimming excess material is necessary in order to remove excess material (column 8 lines 16-38).

It would be desirable to trim excess material from the lead frame of Pflaesterer in view of Fuglevand et al. in order to remove excess material.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to trim excess material from the lead frame in order to remove unneeded material.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaesterer in view of Fuglevand et al., Roche et al. and Draper et al. (US 5,273,838).

The teachings of Pflaesterer, Fuglevand et al. and Roche et al. as discussed above are incorporated herein.

Pflaesterer in view of Fuglevand et al. and Roche et al. teach a method for forming a fuel cell having a lead frame, with the components sealed in a state of compression (see above).

Pflaesterer in view of Fuglevand et al. and Roche et al. fail to teach a fuel cell array.

Draper et al. teach a fuel cell array, wherein each cell in the array is electrically connected by metallic connectors, corresponding to leads of the instant application (abstract).

Draper et al. further teach that having a fuel cell array with the cells connected by leads allows for greater row voltage and for better access of the anodes to fuel flow (column 2 lines 1-6).

It would be advantageous to use the method of Pflaesterer in view of Fuglevand et al. and Roche et al. to create an array of fuel cells having lead frames such as taught by Draper et al., with the components sealed in a state of compression, since such a fuel cell array would have greater row voltage and good fuel access for the anodes.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made use the method of Pflaesterer in view of Fuglevand et al. and Roche et al. to create an array of fuel cells having lead frames such as the array of Draper et al., with the components sealed in a state of compression, since such a fuel cell array would have greater row voltage and good fuel access for the anodes.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pflaesterer in view of Fuglevand et al. and Roche et al. as applied to claim 7 above, and further in view of Montminy et al. (US 2004/0211668).

The teachings of Pflaesterer, Fuglevand et al. and Roche et al. as discussed above are incorporated herein.

Pflaesterer in view of Fuglevand et al. and Roche et al. fails to teach the use of welding to connect components.

Montminy et al. teach the fabrication of a membrane electrode assembly including an anode, polymer electrolyte membrane (PEM), cathode, and flow field plates that can also serve as current collectors integrated by injection molding using a thermoplastic elastomer ([0091]-[0094]). In one embodiment, the material can be injected directly to a space within the flow field plates, but Montminy et al. also teach the use of mold plates as seen in Figure 2.

Montminy et al. also teach the use of welding to connect components ([0096]).

It would be desirable to use welding to connect components of Pflaesterer in view of Fuglevand et al. and Roche et al. since it is well known in the art that welding is a sufficient means for connecting components, especially metal components, since it ensures that the components are secured.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use welding to connect components of Pflaesterer in view of Fuglevand et al. and Roche et al. since it is well known in the art that welding is a sufficient means for connecting components, especially metal components, since it ensures that the components are secured.

Response to Arguments

7. Applicant's arguments filed September 12, 2008 have been fully considered but they are not persuasive.

Concerning Applicant's arguments that the current collector is not integrated into the lead from component, the combination of Pflaesterer in view of Fuglevand et al. As discussed above, Fuglevand et al. renders the current collector having a lead frame obvious. Thus, the lead frame is integral to the current collector.

As Applicants arguments that the current collector is not used to protect the protonically conductive membrane and active areas of the diffusion layers of the fuel cell while the molding place, this limitation concerns the intended use of the current collector. According to the MPEP, the manner of operating a device does not differentiate apparatus claims from the prior art (MPEP 2113). While the claims are method and not apparatus claims, the limitations are to the intended use of the claimed apparatus, specifically the current collector. Further, the current collector would inherently protect the membrane and diffusion layers during the molding process because it provides a barrier between those components and the hot, dry conditions found during the molding process.

Additionally, Applicant argues that Roche et al. do not teach trimming away exterior frame portion of the lead frame only to leave current collector portion of frame. Roche et al. teach trimming of excess material from the current collector after the pressing operation to seal the components of the fuel cell, as discussed above. It is seen from the final product of Pflaesterer that the lead frame of Fuglevand et al., though

supportive to the rest of the components of the fuel cell, is not necessary for a complete product, and this the leads are excess material.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is (571)272-1101. The examiner can normally be reached on Mon-Fri 8-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

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